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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WALKER, KEITH D	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/811,161	SINHA ET AL.	
	Examiner	Art Unit	
	KEITH WALKER	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *16-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Appeal Brief

The arguments presented for claims 6-9 & 14-15 are persuasive and therefore the final rejection of 12/05/08 is withdrawn. As such claims 1-15 are pending examination and are rejected for the reasons set forth below.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5 & 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Publication 2001/0049038 (Dickman).

Dickman teaches a fuel cell system with a power conditioning module (DC-DC converter) that applies conditioned current to a load by using a current meter for measuring and reporting the fuel cell's current to the fuel cell controller, which is part of

the control system (Abstract; Fig. 10; [0046, 0048, 0049, 0057 & 0064]). The controller sets the available output power from the fuel cell and defines the maximum current drawn from the fuel cell through the power conditioning module using communication links ([0034, 0035, 0040 & 0041]). As the upper threshold of the available power of the operating fuel cell stacks is reached, the controller increases the available power by increasing the number of operating fuel cells. Alternatively, if the power demand decreases below a threshold, then the available power is decreased by reducing the number of operating fuel cells ([0046, 0051 & 0067]). It is implicit that when the draw power from the load does not increase over what the operating fuel cells can provide and does not decrease below what fewer fuel cells could provide, the available output power stays constant.

Claims 10-12 are not further limiting to the apparatus since the claims drawn to the intended use of the apparatus. It is held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus satisfying the claimed structural limitations (MPEP 2114). Furthermore, the fuel cell system has an intended use in a motor vehicle ([0032]).

Claim Rejections - 35 USC § 103

2. Claims 1-5 & 10-13 are rejected under 35 U.S.C. 103(a) as obvious over US Publication 2002/0082785 (Jones) in view of US 5,637,414 (Inoue).

Jones teaches a fuel cell system comprising a fuel cell, a battery, a controller and current and voltage sensors. The fuel cell controller uses an algorithm to control the operation the fuel cell system (Abstract, [0018, 0021, 0022, 0024, 0027]). The voltage and current sensors inform the controller of the output voltage and current from the fuel cell as required by the load. A power conditioning module converts the power into AC voltage and supplies the power to a load ([0052]). The controller increases the available power output when an approach threshold is reached and maintains a constant power when the required power is not longer near the approach threshold. In a similar manner power is decreased when a diverge threshold is reached and then a constant power is maintained when the required power is no longer near the diverge threshold ([0029-0038]). The maximum current draw and available output power are set by the number of fuel cells in the stack and the available reactants flowing to the cells.

Claims 10-12 are not further limiting to the apparatus since the claims drawn to the intended use of the apparatus. It is held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus satisfying the claimed structural limitations (MPEP 2114).

Jones is silent to the controller setting a maximum draw current signal to the power conditioning module.

Inoue teaches a fuel cell system with a method of controlling the fuel cell system. The method of controlling the system includes a controller that communicates with a power conditioning module to evaluate and set the maximum available power output for

the fuel cell (Abstract). A command signal from the controller to the power conditioning module sets the maximum available draw current that can be drawn from the fuel cell (Fig. 1; 2:25-3:5, 4:35-5:45). This controlling method prevents the deterioration of the fuel cell performance caused by gas shortages.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the control system with the load following algorithm of Jones with the method of controlling the power conditioning module to ensure the performance of the fuel cell system is not compromised by a fuel gas shortage.

3. Claims 6-9 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2001/0049038 (Dickman) in view of *Power Control Strategy for Fuel Cell Hybrid Electric Vehicles* (Jung).

The teachings of Dickman as discussed above are incorporated herein.

Dickman teaches a power management scheme with a battery assembly ([0048]). However, Dickman is silent to a battery voltage detector or current detector.

Jung teaches a method of controlling a fuel cell and battery system for a vehicle (Abstract). The fuel cell and the battery are electrically connected to distribute power to the load. A controller controls the power distribution and uses power from the fuel cell to recharge the battery when required (pg. 1, para. 4 & 5; pg. 2, para. 1 & 5; Fig.3). The batteries state of charge (SOC) is monitored and maintained (Abstract). The SOC controller monitors either the voltage or the current of the battery (Fig. 5 & 7; pg. 3,

para. 2-5). While the fuel cell is operating the motor, if the battery requires charging, the controller sends the extra power to the battery to recharge the battery (Fig. 3c; pg. 2). Since SOC controller determines the battery current or voltage is below a predetermined limit for some amount of time, the available power produced by the fuel cell is increased above what is required by the motor.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the battery assembly of Dickman with the current and voltage sensors and controller system taught by Jung to increase the system efficiency (Abstract).

4. Claims 6-9 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0082785 (Jones) in view of US 5,637,414 (Inoue) and further in view of *Power Control Strategy for Fuel Cell Hybrid Electric Vehicles* (Jung).

The teachings of Jones and Inoue as discussed above are incorporated herein.

Jones teaches a power management scheme with a battery assembly ([0048]). However, Jones is silent to a battery voltage detector or current detector.

Jung teaches a method of controlling a fuel cell and battery system for a vehicle (Abstract). The fuel cell and the battery are electrically connected to distribute power to the load. A controller controls the power distribution and uses power from the fuel cell to recharge the battery when required (pg. 1, para. 4 & 5; pg. 2, para. 1 & 5; Fig.3). The batteries state of charge (SOC) is monitored and maintained (Abstract). The SOC controller monitors either the voltage or the current of the battery (Fig. 5 & 7; pg. 3,

para. 2-5). While the fuel cell is operating the motor, if the battery requires charging, the controller sends the extra power to the battery to recharge the battery (Fig. 3c; pg. 2). Since SOC controller determines the battery current or voltage is below a predetermined limit for some amount of time, the available power produced by the fuel cell is increased above what is required by the motor.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the battery assembly of Jones with the current and voltage sensors and controller system taught by Jung to increase the system efficiency (Abstract).

5. Claims 6-9 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2001/0049038 (Dickman) in view of US 4,839,574 (Takabayashi).

The teachings of Dickman as discussed above are incorporated herein.

Dickman teaches a power management scheme with a battery assembly ([0048]). However, Dickman is silent to a battery voltage detector or current detector.

Takabayashi teaches a method of controlling the power distribution a fuel cell system that includes a battery. The power output of the fuel cell is increased in response to the battery voltage or current measurements (Abstract, 1:65-2:15). The controller measures and monitors the battery current and when a predetermined battery current is measured for a predetermined period of time, the fuel cell power output is increased (Figs. 1 & 2; 3:45-60, 4:25-50). Instead of using the current as an indicating means, the battery voltage can be used (5:30-60). Increasing the fuel cell output in

response to the current and voltage readings allows for a stable supply of output and extends the life of the battery (6:35-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the battery system of Dickman with the battery and fuel cell controlling means as taught by Takabayashi to increase the battery life.

6. Claims 6-9 & 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2002/0082785 (Jones) in view of US 4,839,574 (Takabayashi).

The teachings of Jones as discussed above are incorporated herein.

Jones teaches a power management scheme with a battery assembly ([0048]). However, Jones is silent to a battery voltage detector or current detector.

Takabayashi teaches a method of controlling the power distribution a fuel cell system that includes a battery. The power output of the fuel cell is increased in response to the battery voltage or current measurements (Abstract, 1:65-2:15). The controller measures and monitors the battery current and when a predetermined battery current is measured for a predetermined period of time, the fuel cell power output is increased (Figs. 1 & 2; 3:45-60, 4:25-50). Instead of using the current as an indicating means, the battery voltage can be used (5:30-60). Increasing the fuel cell output in response to the current and voltage readings allows for a stable supply of output and extends the life of the battery (6:35-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the battery system of Dickman with the battery and fuel cell controlling means as taught by Takabayashi to increase the battery life.

Response to Arguments

Applicant's arguments filed 5/4/09 regarding claims 1-5 & 10-13 have been fully considered but they are not persuasive.

Applicant alleges the teachings presented Dickman as described in the Office Action are not found and there is insufficient discussion in the office action. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

The office action points to all of the recited limitations recited and clearly relates how they anticipate or render obvious the claimed limitations. The following is in response to the only examples provided by applicant as missing from the references.

Applicant argues the office action does not describe “specifically a fuel cell current sensor that measures the draw current of a fuel cell being sent to a power conditioning module of the type claimed, where the measured current is sent to a fuel cell controller that then provides a command signal to the fuel cell using that measured current.” As pointed out in previous discussions, a draw current sensor is taught in at least paragraphs [0060, 0064 & 0065]. Paragraph [0060] teaches using the sensed

draw current for evaluating a fuel cell and paragraphs [0064 & 0065] describe sensing the draw current and sending a signal to a display indicative of the measurement and using the measurement for changing operating parameters of the system. At least paragraphs [0065-0068] describe a controller with a load following algorithm providing a command signal to a fuel cell setting available to a power conditioning module defining maximum current available. Other paragraphs include [0059-0062 & 0068-0070].

Applicant argues "the Examiner has not provided any discussion as what element is the controller and the power conditioning module in Dickman operates in this manner. Presumably, the controller and the power conditioning module talked about in these paragraphs is the same controller and power conditioning module that the Examiner states exists in paragraph [0046], [0048], [0049], [0057] and [0064]." The controller is the same as talked about in the paragraphs and throughout the reference, specifically [0057]. The power conditioning module is the DC-DC converter that conditions the power form the fuel as is taught in the same paragraphs cited. Within the cited paragraphs, the relationship between the components as claimed, is taught.

Applicant alleges that Dickman does not teach the load following algorithm. As clearly taught by Dickman in paragraph [0046], the controller alters the power configuration to follow the load requirements such that “only that number of fuel cell necessary to meet the load demand are brought online and made operational." As such, thresholds for upper and lower limits are taught.

Applicant argues that Dickman does not teach the intended use limitations of claims 10-12. These are not required to be taught, hence intended use.

Applicant's arguments with respect to claims 6-9 & 14-15 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, with respect to the rejection(s) of claim(s) 1-5 & 10-13 under Jones have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Jones in view of Inoue.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH WALKER whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Keith Walker/
Examiner, Art Unit 1795